JUDUL: SMART CLINICAL INFORMATION SYSTEM (SCIS)

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SMART CLINICAL INFORMATION SYSTEM (SCIS)

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This report is submitted in partial fulfillment of the requirements for the Bachelor of Computer Science (Database Management)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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2006

DECLARATION

I hereby that this project report entitled

SMART CLINICAL INFORMATION SYSTEM (SCIS)

Is written by me and is my own effort and that no part has been plagiarized without citations.

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DEDICATION

To My Family, Lecturers and Friend

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There are a number of people to the readers read who have contributed for the completion of this PSM reports who earn to get this acknowledge.

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ABSTRACT

This project paper is record for the Smart Clinical Information System. It works to record the development process of SCIS which is consist of an Introduction, Literature Review and Project Methodology, Analysis, and Design phase. All these phase completed for PSM submission. Clinical Information System that have been discuss in this documentation will eliminate the system constraint that happen to the current system, such as system availability and accessibility of the system and data. In this project papers will design a new framework that will use a well known Smart Card technology to increase the availability of the clinical information. In chapter one will record overview of this project and it will follow up by list out the problem statements of current system having. It will also state the objectives and scopes of the project. After reading the first chapter the reader will have the brief idea for what purpose of this project title have been proposed. For chapter two, it will record down the literature review of title about the current medical and healthcare system availability problem issues and methodology that soon will be use to complete this PSM project. After define the project methodology, the project schedule and milestone will also plan. Chapter three; analysis then will separate into two major parts which are analyst of the current system and to-be system. In current system, it will produce a set of business flow and problem statements of the current system. For to-be system will be included with the functional requirement, software requirement, hardware requirement and network requirement. Chapter four will discuss activities and result of the high level design of the system and prototype. Few things highlighted in this chapter are the design of the system input, output, interface, system architecture, database design and detailed design. Chapter five is implementation of the system which consists of the system, database and hardware implementation. Chapter six which is testing was handled to test the availability of SCIS. For the paper conclusion, will summarized this PSM paper and also the future development.

ABSTRAK

Kertas projek ini merekodkan perlaksanaan projek *Smart Clinical Information System*. Tujuan utama kertas ini adalah untuk mencatat semua proses pembangunan sistem untuk SCIS yang mengandungi topik Pengenalan, -, analisis dan rekabentuk untuk perlaksanaan PSM. Sistem maklumat klinikal yang dibincangkan dalam kertas ini akan menghapuskan kekangan sistem semasa seperti *system availability* dan *system accessibility*. Projek ini akan menghasilkan satu rangka kerja baru dengan menggunakan teknologi terkini iaitu penggunaan Kad Pintar untuk meningkatkan mutu penggunaan Sistem Klinikal. Bab pertama akan melampirkan pandangan secara keseluruhan untuk projek ini termasuk objektif dan skop projek. Selepas membaca bab satu, pembaca akan mendapat gambaran keseluruhan tentang projek ini. Bab dua pula akan menerangkan aktiviti kajian literaktur dan metodologi perlaksanaan pembangunan mengenai isu-isu berkenaan dengan bidang perubatan, klinikal dan kesihatan. Selepas menetapkan metodologi perlaksanaan, jadual perlaksanaan projek disediakan dan dilampirkan di bahagian akhir bab. Bab tiga akan dibahagi kepada dua bahagian iaitu analisis mengenai sistem sedia ada dan sistem yang akan dibangunkan. Pada sistem sedia ada, aktiviti sistem dan masalah sistem dilampirkan. Untuk sistem yang akan dibangunkan pula, akan melibatkan keperluan sistem, keperluan perisian, keperluan perkakasan dan keperluan rangkaian. Bab empat akan menunjukkan rekabentuk sistem secara ringkas dan padat. Beberapa bahagian yang diutamakan dalam bab empat ialah rekabentuk kemasukan data, output data, perantaramuka, arkitektur sistem, organisasi sistem, kamus data dan rekabentuk sistem terperinci. Bab lima ialah implementasi projek yang terdiri daripada implementasi system, pangkalan data, dan perkakasan. Bab keenam adalah bab pengujian (*testing*). Dimana tahap kebolehan SCIS diuji. Akhir sekali, untuk kesimpulan PSM , bab terakhir akan membuat kesimpulan untuk kertas projek ini serta akan menyatakan aktiviti untuk masa depan.

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LIST OF ABBREVIATION

ABBREVIATION	DESCRIPTION
SCSI	Smart Clinical Information System
PDC	Patient Data Card
HPC	Health Professional Crypto processor Smart Card
PKI	Public Key Infrastructure
AUT	Application Under Testing
KUTKM	Kolej Universiti Teknikal Kebangsaan Malaysia
PSM	Projek Sarjana Muda
VB	Visual Basic
GHz	Giga Hertz
ICT	Information Computer Technology
LAN	Local Area Network
RDBMS	Relational Database Management System
GB	Giga Byte
NA	Not Applicable or Not Available

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CHAPTER I

INTRODUCTION

1.1 Project Background

After the widely usage of computers in almost every aspect of today's life, new appropriate ways to deal and handle medical data is taken into consideration. From the early days of computers the need of replacing the 'old' paper records with computer based records was more than emerging. The reasons are obvious and almost identical with all the other areas where computers are used, speed, accuracy, storage limitations etc. Moreover it is well understood that computerization of health information while offering new opportunities to improve the health care systems, it also creates new challenges of how to deal with such sensitive medical information. Whether on paper or in any other electronic form, the information contained in patient records, generated and maintained by the health industry is called health care information.

As the project titled Smart Clinical Information System this project will be developed is under the medical industry. Main purpose of the system is to keep the patient information in a smart card where they can always bring their medical record anywhere. Besides that, current rapid growing technology such as smart card will be considered and applied in the project. In the search for fast, secure, and accurate patient clinical information storage, smart cards offer advanced options to care providers and patients. Smart card technology allows health care providers and health care organizations to streamline medical processes, participate in secure health care data

exchange, as well as increase quality of service through improved data access. This is suite with our government's effort to upgrade the healthcare sector by encouraging research and development (R & D) to improve healthcare services to its people.

The area of study is at polyclinic Komuniti Ayer Keroh, Melaka. There are two polyclinic Komuniti exist in Malacca which are Polyclinic Komuniti Peringgit and Polyclinic Komuniti Ayer Keroh. Polyclinic Komuniti Ayer Keroh was launch on 8th of July 2003 by Chief Ministry of Malacca, YB Datuk Wira Mohd Ali bin Mohd Rustam. The Director of the polyclinic is Dr. Hj. Jamal bin Ali Johari and the main departments or clinic exist are registration department, dental, radiology, rehabilitation, maternity, general outpatient, laboratory and pharmacy. The opening hours are: Monday to Thursday;8.00am to 1.00pm and 2.00pm to 5.00pm; Friday; 8.00am to 12.15pm and 2.45pm to 5.00pm; and close on the weekend and public holiday.

By using the My Card, the patient information extracted into the Patient Registration Module. Then, the patient registered into polyclinic and Patient Smart Card will be print by the clinic and gave to the patient. The different of this project with the current Patient Registration System is the usage of Patient Smart Card are expand which after the consultation with the physician or medical assistant, if the patient are referred to other department such as x-ray, patient will bring their Patient Smart Card then the patient record can be easily retrieved by other physicians.

Currently the polyclinic still using a manual system, where a computerized system is absolutely needed to produced more efficient health care system with the quality of service.

1.2 Problem Statements

As stated in the previous part (Project background), the polyclinic are still using a manual system by keeping the patient data or records either in paper or book. In short term, this may seem more beneficial than owning a computer system but in a long run, many problems will arise.

Polyclinic well known as a Patient- centered organization should be no manual system because the job involved with people life. The efficient service quality should be provided. Even though it maybe cheaper to just jot down important data in books or papers, it maybe even cheaper uses Information System in long run. Using manual system, many problems occurred in order to fully the patient's needs or treatment.

Below are the problem faced by the polyclinic which still uses a manual system:

- **Unsecured Data**

By using the file systems structure the data security of a clinic not completely safe. The patient information and all the medical treatment data could be lost. But in using a computerized system, the system will locate an authorization part as a login to authenticate the user.

- **Difficult To Access Information And Make Decision**

This is happen when if one patient was sent to other department or specialist clinic such as imaging, if the doctors need the patient's record, the record are difficult to retrieve by the doctor. Currently, they will ask an attendant to send the patient card or record which get from the doctors who consult the patient is. So, the information is always delayed.

- **Data Inconsistency**

This is happened when the data in a file starts to be redundant. The redundant data will caused an inconsistency of data. That means, when there is same Patient ID was use by two patients; the patient record will be mess.

- **Storage and Space Constraint**

By using manual system, all the record is placed in files and need more large space to put the entire Patient record. By using this computerized system, all the data could be save in one database only.

- **Standardization of Report and Documentation**

The entire policlinic record that is hand written may vary in size. Sometimes, each physician may not be able to read the records written by the other physician or nurses. So, problems may arise if wrong information held.

1.3 Objective

Below are the objectives to produce the SCIS:

- **To produce data security**

One of the promises of Smart Clinical Information System (SCIS) is to increase the data security in health care, thereby decreasing costs. The system will give privileges to each physician, pharmacist, dentist, radiologist and other polyclinic committee based on their work area. So that the medical information is more secure.

- **To improve data accessibility and decision making time**

Timely access to patient's record trough Smart Card will help the medical officer to provide optimal care treatment. Thus, the delay time for treatment can be minimized.

It is very crucial in case of emergency time where availability of medical record is needed to make a right decision at the spur of the moment.

- **To produce data consistency**

One possible way of decreasing costs would be by avoiding duplicative or unnecessary diagnostic or therapeutic interventions, through enhanced communication possibilities between health care establishments, and through patient involvement. SCIS may enhance the quality of health care for example by allowing comparisons between different providers, involving consumers as additional power for quality assurance, and directing patient streams to the best quality providers.

- **To improve storage problem**

Using computerized system and a Smart Card enabling all the patient information saved in less storage capacity needed.

- **To improve the standardization of report and documentation**

Enabling the patient information exchange and communicate in a standardized way between health care establishments.

1.4 Scope

The proposed project will be used at the registration/admission counter, consultation room, pharmacy, and the laboratory. The targeted users for the project will be the project supervisor and healthcare practitioners that play role as healthcare domains.

The prototype application will consist of modules as mentioned below:

- System Log In Module
  This module manages the user access through the user login.

- Patient Registration (PR) Module
  This module will use to management the patient registration. Patient will only capable to use the system if they have been register in this module.

- Queue Management (QM) Module
  This module will work for automatically or manually generates queue number for the registered patient visit.

- Patient Consultation Management Module
  This module will work manage the patient consultation transaction each patient and save a medical summary as the reference.

- Appointment Schedule (AS)
  This module is use scheduled an appointment between the patient and physicians.

- Order Management(OM)
  This module used for the physician to order test or medication either to the laboratory or pharmacy.

- Report Generation(RG)
  This module will work for manage the monthly report for the clinic e.g.: how many diseases occur in one month.

1.5 Project Significance

The targeted users for the project will be paramedics and healthcare practitioners which are the patient, physicians, nurses, the pharmacist and registration clerk. The system will be a computerized system without manual system. Added with the usage of Patient Smart Card that will be store the main medical information needed by the doctors and others medical staff.

In this patient-centered project, medical practitioners can access critical patient information even they cannot connect to central patients' database. It is very significant to get patient's health record during emergency. Such an immediate availability and easy access of critical patient's record in time of emergency and the family of the patient only have to give the Smart Card to the clinic or medical centre to admit the patient.

Besides, the entire problem using a manual system automatically solved. In the registration/ admission part, the time to admit new patient could be minimized because the basic patient data are transfer from patients' My Card. Smart card reader/ writer device will be used to communicate with the smart card.

1.6 Expected Output

From the scopes, below are the expected outputs should be produce by the SCIS:

- System Log In Module
  This module manages the user access through the user login.

- Patient Registration (PR) Module

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